WHAT IS CLAIMED IS:

1. A process for preparing a carbon molecular sieve, comprising:

providing a template having an internal structure defining pores;

contacting a composition with the template so as for the template to absorb and retain the composition in the pores thereof, wherein the composition comprises a polymerizable compound comprising carbons;

polymerizing the polymerizable compound while being retained in the pores of the template, thereby forming a polymeric material having carbons retained in the pores of the template;

subjecting the template and the polymeric material retained therein to heating sufficient to thermally decompose the polymeric material and to substantially remove non-carbon elements therefrom; and

removing the template.

2. The process of Claim 1, wherein the removal of the template comprises contacting the template with an acid or base.

3. The process of Claim 2, wherein the acid comprises hydrofluoric acid, and the base comprises a sodium hydroxide.

4. The process of Claim 2, wherein the acid or base for removal of the template is in an aqueous or alcoholic solution.

5. The process of Claim 1, wherein the template comprises a molecular sieve.

6. The process of Claim 1, wherein the template comprises a mesoporous silica molecular sieve.

7. The process of Claim 1, wherein the mesoporous silica molecular sieve comprises aluminum.

8. The process of Claim 1, wherein the pores of the template comprises one-dimensional pores interconnected one another.

9. The process of Claim 8, wherein the size of the one-dimensional pores is from about 1 nm to about 50 nm.

10. The process of Claim 8, wherein the size of the one-dimensional pores is from about 2 nm to about 20 nm.

11. The process of Claim 1, wherein the template comprises SBA-15, Aluminum SBA-15, SBA-3 or Aluminum SBA-3.

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12. The process of Claim 1, wherein the polymerizable compound comprises a carbohydrate.

13. The process of Claim 12, wherein the carbohydrate is selected from the group consisting of sucrose, xylose and glucose.

14. The process of Claim 12, wherein the composition further comprises an acid.

15. The process of Claim 14, wherein the acid is selected from the group consisting of sulfuric acid, hydrochloric acid, nitric acid, sulfonic acid and methylsulfonic acid.

16. The process of Claim 1, wherein the polymerizable compound comprises a non-carbohydrate precursor of a polymer.

17. The process of Claim 16, wherein the non-carbohydrate precursor is selected from the group consisting of furfuryl alcohol, aniline, acetylene and propylene.

18. The process of Claim 1, wherein the heating for the thermal decomposition of the polymeric material is performed under vacuum or without oxygen.

19. The process of Claim 1, wherein the heating is to heat the polymeric material at a temperature of from about 400 °C to about 1400 °C.

20. A carbon molecular sieve produced by the process of Claim 1.

21. A carbon molecular sieve comprising an internal structure of carbon atoms, which defines at least partly substantially uniform pores, wherein the pores have a diameter of from about 1 nm to about 50 nm.

22. The carbon molecular sieve of Claim 21, wherein the pore size is from about 2 nm to about 20nm.

23. The carbon molecular sieve material of Claim 21, wherein the volume of the pores is from about 1.0 cm^3/g to about 3.0 cm^3/g.

24. The carbon molecular sieve of Claim 21, wherein a Brunauer-Emmett-Teller (BET) specific surface area is from about 1000 m^3/g to about 3000 m^3/g.

25. The carbon molecular sieve of Claim 21, where the carbon atoms form nano-lines which form a substantially uniform hexagonal structure, and wherein the pores have substantially a single uniform diameter.

26. The carbon molecular sieve of Claim 21, where the carbon atoms form nano-tubes which form a substantially uniform hexagonal structure, and wherein the pores have substantially two uniform diameters.

27. A method of storing hydrogen, comprising:

providing a composition comprising the carbon molecular sieve of Claim 21; and

contacting hydrogen with the composition so that the carbon molecular sieve in the composition can absorb and retain the hydrogen in the internal structure thereof.